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Wood Shop Acclimation Project for the Beginning Design Student

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Shop safety courses have long been the only way to introduce beginning design students to the tools, methods and appropriate behaviors in a shop environment. These courses and programs are geared towards providing important knowledge so the student can successfully engage the shop. However, they lack hands on experience and can often lead to creating a culture of fear, with some students, around certain tools and operations and also not address important issues related to the efficient use of materials, equipment and time.

The wood shop acclimation project is executed in conjunction with the first semester freshmen design studio and is taken shortly after students take the provided woodshop safety course and prior to being asked to make anything in the woodshop on their own. It is provided to allow for greater hands on instruction for each student, creating in the students a better sense of confidence in operating the equipment safely and efficiently.

The project was conceived as a way to integrate pedagogy and production. The main focus is to teach important hands on lessons that were usually left out of a typical shop safety course. And secondly to efficiently mass produce a specific item that each student would be required to build to support their current studio project in some way, as a site or as a display.

In the initial presentation for the project the students are shown Walter Pichler's Watchwoman of the table saw.[i] The sculpture stands two feet high straddling the blade of his table saw. For Pichler, every time he needs to move the heavy bronze idol in order to use the saw it allows him to recall the respect and attitude that must be given when operating such a machine. The concept of this work leads our conversation with the students to one of preparation and planning. Since all the preparation and planning for this project had been done by the faculty the students are walked through the reasoning for all the design decisions applied to the mass produced object. Often highlighting economy of means as major design consideration. Since each project always uses plywood as its main material the dimensions of that sheet in relation to each item's components are carefully calculated to minimize scrap. Instilling in the students an important lesson in valuing material.

A full set of construction drawings are provided for the students showing all dimensions, cuts, dados and location of holes for assembly. Included in this set of drawings is a page showing the layout of all pieces that will be cut for the entire class and emphasized what little scrap will be left.

The students are broken up into groups of ten or less and two instructors are on hand to guide the students through a step-by-step process designed and laid out for them. It takes them from a full sheet of plywood to the final assembled item. Along the way certain tools such as the panel saw, table saw and compound sliding miter saw are described in terms of what they do well and why they are being chosen to perform the specific operation in the process.

The Panel saw is most efficiently used to cut down a large full sheet of plywood into more manageable sections. This saw is usually located near the entry so you do not have to wield a full sheet through the shop. The students are told that this saw does not have a high level of accuracy and that they should at all times try to make final more accurate cuts on the table saw or miter saw.

The table saw is the workhorse in any professional shop, but in most architecture and design shops it is often the band saw that gets that title. Most students see and here and retain all the good things when it comes to a band saw and all the bad things when it comes to a table saw, which at times may be the objective of the shop coordinator for "safety reasons". Both saws have their pluses and minuses when it comes to safety but the real objective of the Wood Shop Acclimation Project is to give the students the correct knowledge and allow them to get comfortable using the equipment while giving them a forum to ask questions. The band saw in three of three shops I have worked in has each time had the most injuries clocked over any other machine in the shop. While this is most likely due to the large volume of usage it also has to do with the high level of comfort and inappropriate usage of the machine.

Today most shops are beginning to purchase the SawStop table saw which has some great advancements in table saw safety most notably the blade retraction feature. The company description:

> SawStop Saws are the most advanced saws in the world. Each saw is equipped with a safety system that detects when someone accidentally contacts the spinning saw blade, and then stops the blade in milliseconds. In most cases, such an accident would result in just a nick on a SawStop saw, instead of the devastating injury which would likely occur on an ordinary saw.

The description of this feature can instantly ease the mind of a student who has come to the table afraid or uneasy about the machine.

The main reason for getting the students acquainted with the table saw is that unlike the panel saw and the band saw, the table saw has the highest degree of accuracy and efficiency built into it making it an absolute necessity for any maker.

The compound sliding miter saw is a quick and easy way to make cross cuts, and when used with a stop, repetitive cuts are accurate each time.

As an extension to the shop safety course, students are given three concepts to apply to each tool in order to operate it safely and without damage to it, themselves or the material. These concepts are feed, guide and support and are described at each part of the process for each tool. This gives the students a starting point to correctly evaluate how they need to use the machines properly.

The first concept is guide. A guide is simply a way to ensure that a cut is being made precisely the way it was designed to be. In all cases with the projects made in the Wood Shop Acclimation Project they are 90 degree cuts made parallel to the guide in the case of the panel saw and table saw and perpendicular for the compound sliding miter saw. Students are taught to always focus their attention on keeping the material to be cut properly against the guide to limit any possibility for accidental kickback or cutting errors. They are also instructed that it can be dangerous to employ the use of two guides at the same time and if they must set up this way to discuss it with the shop coordinator. But none-the-less they are given the proper understanding of why this concept is so important.

The second concept is feed. Feed is what pushes or pulls the material through the cutting blade. In some cases, like with the table saw the blade is stationary and the material is pushed through the blade and in others, as with the panel saw and compound miter saw, the material is stationary and the blade is pulled through the material. What these all have in common is that our own bodies supply the energy to pass the material through the blade or vise versa. What needs to be understood is that in all cases you can push or pull to slow or too fast. Students are taught two simple indicators, when you are going to slow you might begin to smell wood burning from the friction of the blade passing the material, so speed up. When going to fast you will hear the sound of the machine labor more intensely making a higher pitched noise, so slow down. They are also told that similar to the concept of guide it is important to only have one source of feed. The example given to them has to do with the surface planner where unlike the above mentioned tools its feed is mechanical and built into the machine. The body does not have to push or pull the material through and to do so may cause problems with the planner itself or the desired cut. In relation to the table saw this comes into play when some one is assisting on the out feed table as extra support, that assistant should never pull the material and should act solely as extra support.

The last concept is support. As briefly mentioned above support is simply proper support of the material while it is being cut. Common sense will tell you that the table of the table saw, because of gravity, is the proper support for the material as it is being cut, as well as the body when holding the material when feeding through to the blade. Students are instructed to always set their material on the table to make sure it can fully be supported going in and out. Most shops have an integral out feed table which can support material up to 8 feet long, when this is not present it is important to set up roller stands or have another person assist with supporting the material as it come out after being cut. With support, unlike guide and feed, it can never hurt to have too much.

Lastly throughout the process students are given an introduction into the appropriate use of jigs and fixtures to aid in the process of mass-producing the item. This stresses the importance of planning out the sequence of how you make something as well as supporting the decision of which tool to use for a specific operation. For example a sled is made for the table saw with multiple

fixtures attached to it allowing each part to be cut efficiently and precisely with out measuring that can often lead to error. Also assembly jigs are made so that holes can be drilled identically without the need to measure and mark.

The wood shop acclimation project not only serves as an important safety and instructional tool but also as a means to show the students via the design process a way to consider construction, fabrication sequencing and logic related to material and fabrication processes. And most importantly instill in the students a high level of knowledge driven comfort in engaging the wood shop.

Cutting with the panel saw and the table saw.

Receiving instruction on the table saw.

Cutting with the shop made table saw sled.

Sandboxes made as sites during the Fall 2005 semester for the elemental house project.

Pedestals made during the Fall 2006 semester for the Buffalo Scaled project.

[i] Pichler, Walter, Walter Pichler drawings, sculpture, buildings (New York, NY: The Princeton Architectural Press, 1993) 5.